## Space Weather Forecast

Issued on Wednesday, 03 May 2023 at 13:30 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: R1 Minor-R2 Moderate radio blackouts expected throughout. Chance of R3 Strong radio blackouts. Slight chance of G1/Minor Storm conditions at start and end of period.**

**Analysis of Space Weather Activity over past 24 hours**
**Solar Activity:** Solar activity has been Moderate through the last 24 hours, with a recent increase in activity from a highly magnetically complex region in the northeast quadrant, which produced three Moderate flares in quick succession. This region has evolved rapidly, along with a region to the east, which due to the position close the limb is currently difficult to analyse. AR3288 close to the southeast limb is also magnetically complex and has produced a number of flares through the last 12 hours. A region close to the northeast equator is also complex, but relatively inactive. There are eight regions on the visible disc, with the remaining four regions all relatively simple and inactive.

Two CMEs (coronal mass ejections) which emerged from the northwest of the solar disc late on 02 May have been analysed and confirmed as far-sided eruptions, with no forecast Earth-directed component.

**Solar Wind / Geomagnetic Activity:** The solar winds are slowly easing and are now at mainly slightly elevated levels. Total magnetic field strength was weak, with the important north-south component also varying weakly. Geomagnetic activity was Quiet throughout.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

**Four-Day Space Weather Forecast Summary**
**Solar Activity:** Moderate activity is expected through the next four days as two magnetically complex regions in the northeast quadrant, with a history of notable activity rotate across the solar disc. There is a chance of Strong flares, mainly from these regions.

**Solar Wind / Geomagnetic Activity:** A CME which left the Sun on 29 Apr may glance the Earth on 03 May, but with a declining risk through the day. Further analysed CMEs are determined not to be Earth-directed. The current slightly elevated solar wind is expected to decline through 03 and 04 May, with a further fast wind, perhaps connecting with Earth on 05 May although the strength of any connection is uncertain. Geomagnetic activity is expected to be mainly Quiet, with a slight chance of Active or G1/Minor Storm intervals on 03 and 05 May.

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**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is expected to be background with no solar radiation storms occurring. However count rates may increase with any notable flares that occur, with a slight chance of reaching the S1 Minor Radiation Storm threshold throughout, mainly from the complex region in the northeast quadrant.

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 10 | 5 | 10 | 5 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 90 | 80 | 80 | 80 |
| Very Active | R3 to R5 X | No | 20 | 20 | 20 | 20 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 10 | 10 | 10 | 20 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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